On some Irish *Gasterostei*.

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The following short remarks on some Irish Sticklebacks are based upon a small collection of fish which I made in June this year whilst with Dr. Dobson at Edgeworthstown (county of Longford), Ireland.

My attention had been drawn to Dr. Sauvage's interesting revision of the family Gasterosteidæ ('Nouvelles Arch. du Mus. d'Histoire Naturelle,' 1874), which I had with me, and wherein he augments the species resident in Europe from seven (as given in the 'Catalogue of Fishes of the British Museum' in 1859) to seventeen. Dividing the genera into three subgenera, he attaches considerable prominence to the presence or absence of plates along the sides, whilst the character of the pubic bone is deemed of sufficient importance to form a subgenus upon it. I wished to test his conclusions by fresh specimens; and if results tend to throw doubt upon some of his admitted species, it must be remembered that my facts have been collected subsequent to the publication of the memoir alluded to.

Abnormal variations of form or structure in single specimens, of course, are not of the same importance in zoology as abnormal variations or varieties of species due to local influences. The *first* may be accidental, as owing to injury in the specimen; the *second* has some local cause at work, the action of which is more or less apparent in the whole of the members of the species. When such local effects can be ascertained, they are interesting; where the cause can be shown, doubly so; for a local cause may have a wider signification than is at first apparent.

Some fishes doubtless show a greater proclivity to abnormal deviations from the original type than others. Thus the Perch (*Perca fluviatilis*) is not considered to be subject to any considerable variation in the normal number of its dorsal spines and rays; on the other hand, the contrary is observable in the majority of the East-Indian freshwater Acanthopterygian forms.

Much stress has been laid in ichthyology on the presence or absence of ventral fins. Irrespective of the apodal fishes, we have, amongst the Acanthopterygians in the family Ophiocephalidæ, the genus *Channa*, separated from *Ophiocephalus* owing to its

wanting ventral fins, which, however, are but indifferently developed in the latter genus. For the same cause, amongst the Siluridæ, *Ailichthys* is separated from *Ailia*. In the Cyprinodontidæ *Tellia* is a *Cyprinodon* deficient in ventrals. In the Cyprinidæ, subfamily Cobitidina, *Apua* is closely allied to *Acanthophthalmus*, but has no ventrals; whilst one of the chief differences between the Clupeoid *Opisthopterus* and *Pellona* is that the former is without ventrals, whilst the latter has only small ones*.

Amongst a number of Sticklebacks (Gasterosteidæ) obtained in Ireland were two very distinct species. The one was bright pink on the chest and along the under surface of the body; whilst the second or more elongated form was of a dull cobalt-blue on the head and chest †. The pink ones had three or four serrated dorsal spines; the blue ones from two to nine smooth spines, and were either without or with small ventral fins.

Had I merely captured specimens of this little species (destitute of ventral fins), I might have been induced to believe that I had discovered a novel subgenus of *Gasterosteus*. But as specimens came to light demonstrating that the ventral spine might be present, and this not due to age or sex, the fact became obvious that the presence or absence of this fin in *Gasterosteus* is insufficient even to characterize a species. And when one considers that the comparative length of the ventral spine to the pubic plate is still looked upon by some ichthyologists as a good diagnostic signification of a species, one is tempted to question the correctness of such a proposition.

Before entering upon the description of the fishes obtained, it

* Respecting the marine fifteen-spined Stickleback, Couch remarks of the development as follows:—"At the precise time of quitting the egg the young were placed under a magnifier of moderate power, when it was observed that .... the belly was protuberant, and in some the ovum was still visibly attached to the body, and, as the point of union was diaphanous, globules could be seen that had passed from the egg to the intestine. No ventral fins could be perceived, which is less a matter of surprise that it has been observed in other instances; these organs are the last that go through the process of development" (Fish. British Islands, vol. i. p. 183).

† Newman observes, 'The Fishes of Scandinavia,' that the *G. pungitius*, or "sma sprigg" of Sweden, during the breeding-season, is coloured red about the lower jaw, cheeks, gill-cover, and base of the pectoral. Those I obtained in Ireland were breeding, and of a colour as described above.

may not be amiss to point out that the Acanthopterygian, or spiny-rayed, fishes appear to be most numerous in the ocean (preying upon their articulated-rayed neighbours the Clupeidæ &c.); but as we examine waters more inland, the Salmonidæ or Cyprinidæ usurp their place, these latter not being possessed of spinate, but merely articulated rays. A maritime residence appears most adapted for the Acanthopterygian or spiny-rayed fishes; a fresh-water inland one to the Malacopterygian, or spineless forms. The family Gasterosteidæ, however, are found in both localities, and, being so, are well worthy of particular attention.

M. Blanchard observes of the Gasterosteidæ, that it is in the vicinity of the coast that we find the species in which the armature is most largely developed, whilst those having the free portion of the tail unarmed are met with at the greatest distance inland.

The single known marine species *G. spinachia* has about fifteen dorsal spines, whilst laterally the body is covered with plate-like scales. In the inland forms we do not find such a numerous development of the dorsal spines. The *G. pungitius* to which I shall have to allude, is possessed of the most (or nine) spines; but these may be materially reduced in number, as to four, or even to two; whilst its ventral spine may be entirely wanting, owing to a non-development of the pubic plate.

Amongst the fishes which I obtained were the following:—

GASTEROSTEUS PUNGITIUS, *Linnæus, Yarrell, Günther, Couch, &c.*
Length of head $3\frac{3}{4}$ to $4\frac{1}{3}$, of caudal $5\frac{2}{3}$ to $7\frac{1}{4}$; height of body $5\frac{1}{4}$ to $6\frac{1}{3}$ in the total length. *Eyes*, diameter $3\frac{1}{4}$ to 4 in the length of head, one diameter from the end of snout, and also apart. The maxilla extends posteriorly to below the front edge of the eye. *Fins*, first eight dorsal spines of varying length, but low, being about half the height of the rays, all smooth, the last being invariably the longest; caudal slightly lobed. Ventrals entirely absent in eleven out of thirteen specimens, whilst the pubic plate was also deficient.

Out of 13 specimens varying from 1·4 inch to 2·1 inches in length were the following:—

2 specimens, each 1·7 inch long	D. 9/9, P. 10, V. 1. A. 1/9, C. 12.
9 specimens, from 1·4 to 1·9 inch long ...	D. 8–9/9–10, P. 10, V. 0, A. 1/9–10, C. 12.

1 specimen 2·1 inches long ..... } D. 4/10, P. 10, V. 0, A. 1/9, C. 12.

1 specimen 1·6 inch long ..... } D. 2/9, P. 10, V. 0, A. 1/9, C. 12.

In the specimen with only two dorsal spines the seventh and ninth were visible, the remainder not appearing above the integument.

In examining the specimens wherein ventral spines existed, they, as a rule, were not one half the length of the pubic plate; in one specimen the spine on one side of the body was one third shorter than its fellow on the opposite. In those wherein no ventral spines existed, the pubic plate was also absent, and, as a natural result, the spines which arise from it were likewise deficient.

Further extended investigations are necessary to solve the question, whether these fishes which are resident far inland are subject to an arrest of development in their ventral spines and pubic bones, or whether those which live nearest the coast have, as a consequence, an increased development of offensive or defensive armature.

Diagrams of Stickleback and ventral plates.

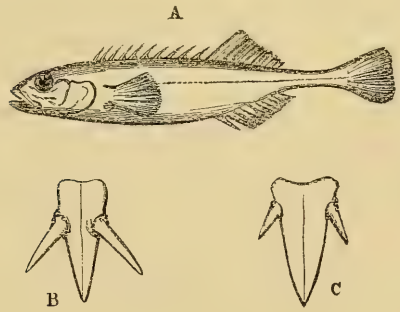

Fig. A, abnormal example of *Gasterosteus pungitius*; B, ventral spines &c. of specimen of *G. aculeatus*; C, ventral spines &c. of second specimen of *G. aculeatus*.

G. ACULEATUS, *Linnæus, Yarrell, Günther, Couch, &c.*

D. 3–4/11–12, P. 10, V. 1/1, A. 1/8–9, C. 12.

Without entering into any detailed description of the fish of this species or its synonymy, I will merely advert to such varieties as were captured. Out of upwards of two hundred specimens, none

were deficient of any portion of the pubic arch; but the triangular pubic plate differed both in its form and size. The height of the dorsal spines was subject to great variation, and the comparative length of the ventral spine to the pubic plate was inconstant, these variations not being due to the size of the specimens (see figs. B and C).

The lateral scale-like plates were either three long ones articulating with the ventral plate, or else a fourth and even a fifth were also present—this being an advance towards the variety *trachurus*, wherein these plates are found along the whole length of the body of the fish.

Those with three dorsal spines had the first two from $1\frac{2}{3}$ to 2, $2\frac{1}{3}$, and 3 times in the height of the body; those with four spines had the second 2 to $2\frac{1}{4}$ and $2\frac{1}{2}$ in the height of the body. This species appears to be subject to various deviations from the type, seen in the greater or less amount of scaly plates along the sides, and in the difference observed as to the comparative length of the ventral spine to that of the pubic plate. Desirous, however, of testing these questions, I examined numerous specimens of this fish captured at the same place; and they give the following results:—

As an average, specimens

2·4	inches	long,	ventral spine	from $\frac{3}{4}$	to $\frac{5}{6}$	length of pubic plate,
2·2	,,	,,	,,	,,	$\frac{5}{6}$	,, ,,
2·1	,,	,,	,,	,,	$\frac{2}{3}$ to $\frac{4}{5}$	,, ,,
2·0	,,	,,	,,	,,	$\frac{3}{4}$	,, ,,
1·5	inch	,,	,,	,,	$\frac{3}{4}$	,, ,,

If we turn to the definition of this species, we find the ventral spine given as nearly or quite as long as the pubic plate.

There were other variations likewise perceptible in these Irish specimens: in some the ventral spine was serrated on both sides, in others only externally; the dorsal spines were likewise much less serrated in some than in others. But to me all appear to be varieties of one species; and if such can be discovered in so limited an extent of country, one cannot but surmise that a search through an extended area might be productive of greater results, and occasion the suppression of several, at present, recognized species.